ELEMENTARY ALGEBRA

These questions will test your knowledge of operations involving functions; factoring simple quadratic equations; evaluating algebraic expressions using substitution; and properties of integer exponents. Elementary Algebra questions make up approximately 17 percent of the ACT Mathematics Test.

Difficulty Level: Easy

1. For all a and b, $(2a - b)(a^2 + b) = ?$
   A. $2a^2 - b^2$
   B. $2a^3 - b^2$
   C. $2a^3 + ab - b^2$
   D. $2a^3 + 2ab - a^2b^2$
   E. $2a^3 - a^2b + 2ab - b^2$

2. The expression $x^2 - x - 42$ can be written as the product of 2 binomials with integer coefficients. One of the binomials is $(x - 7)$. Which of the following is the other binomial?
   F. $x^2 - 6$
   G. $x^2 + 6$
   H. $x - 6$
   J. $x + 6$
   K. $x + 7$

3. On a recent test, some questions were worth 3 points each and the rest were worth 2 points each. Bailey answered correctly the same number of 3-point questions as 2-point questions and earned a score of 80. How many 2-point questions did she answer correctly?
   A. 10
   B. 13
   C. 15
   D. 16
   E. 18

4. Which of the following is equivalent to $10^{\frac{1}{2}}$?
   F. 5
   G. $\frac{1^2}{10}$
   H. $\sqrt{10}$
   J. $\sqrt[5]{10}$
   K. -1×10^2

5. What is the value of $4 \times 2^{a+b}$ when $a = -2$ and $b = 3$?
   A. -8
   B. 8
   C. 12
   D. 16
   E. 24

Difficulty Level: Medium

6. If x is a real number and $5^x = 625$, then $3 \times 3^x = ?$
   F. 5
   G. 9
   H. 45
   J. 125
   K. 243

7. Given $f(x) = 2x^2 - 3x + 6$, what is the value of $f(-4)$?
   A. 26
   B. 50
   C. 58
   D. 76
   E. 82

8. $(2a - 3b)^2$ is equivalent to:
   F. $4a^2 - 12ab + 9b^2$
   G. $4a^2 - 10ab + 9b^2$
   H. $4a^2 - 9b^2$
   J. $4a^2 + 9b^2$
   K. $4a - 6b$

Difficulty Level: Hard

9. If $h(x) = g(x) - f(x)$, where $g(x) = 5x^2 + 15x - 25$ and $f(x) = 5x^2 - 6x - 11$, then $h(x)$ is *always* divisible by which of the following?
   A. 17
   B. 9
   C. 7
   D. 5
   E. 3

10. Given $f(x) = \dfrac{x^3 + \frac{5}{8}}{x + 14}$, what is $f\left(\dfrac{1}{2}\right)$?
    F. $\dfrac{7}{2}$
    G. $\dfrac{20}{8}$
    H. $\dfrac{36}{24}$
    J. 1
    K. $\dfrac{30}{32}$